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Analysis of Microsize Particulates

Unique methods for analyzing individual particles ranging in size from 0.01 to 1000 micrometers have been developed for investigation of the nature of cosmic dust. The methods are also applicable to the particulate aerosols and contaminants characteristically encountered in studies of air pollution and in experiments with methods designed to abate pollution. Analysis of particulates is also of especial interest in the forensic sciences.

The methods are nondestructive; as a result, single particles can be studied by a number of methods. For example, a particle as small as one micrometer may be mounted on a substrate or glass rod for x-ray analysis and then later remounted for another study. Analysis is routinely performed by combinations of transmission electron microscopy, scanning electron microscopy, electron probe microanalysis, x-ray diffraction, optical mineralogy, and density measurement. Specimens larger than one micrometer are manipulated on a routine basis, and a computer program stores and retrieves data on all particles analyzed so that rapid analysis can be made for many parameters.

Considerable care must be exercised to ensure that samples are not contaminated by laboratory dust; all particle manipulation is performed in a clean room facility meeting Federal Standard 209, Class 100 (fewer than 100 particles larger than 0.5 micrometer in every 0.028 m³ [1 ft³]). When particles are col-

lected on the nitrocellulose film which usually overlays conventional electron microscope grids, laboratory contaminants are distinguished from collected specimens by a double-shadowing technique in which a thin metal film is deposited in vacuum before and after particle collection; particles that were present before collection will have two shadows, but the collected particles will have only one.

Reference:

Blanchard, M. B.; Farlow, N. H.; and Ferry, G. V.: Methods of Analyzing Microsize Particulate Aerosols and Contaminants. Joint Conference on Sensing of Environmental Pollutants, Palo Alto, California, November 8-10, 1971, AIAA Paper No. 71-1104.

Note:

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
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Moffett Field, California 94035
Reference: B72-10565

Patent status:

NASA has decided not to apply for a patent.

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